DATA SHEET

TDA1523
Stereo cassette head preamplifier and equalizer

Preliminary specification
File under Integrated Circuits, IC01

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Philips
Semiconductors





Stereo cassette head preamplifier and equalizer

TDA1523

FEATURES

- Two independent amplifiers with open-loop gain of 90 dB (typical)
- Internal DC feedback via 140 kΩ resistor from output to feedback point
- AC characteristics that can be determined externally by an RC network
- Electronic on/off switching with transient suppression for switch on
- Head input at DC ground that eliminates the input coupling capacitor
- Minimum external component requirement
- Stability down to a gain of 30 dB
- Low input noise
- Low distortion
- DC input current <2 μA.

GENERAL DESCRIPTION

The TDA1523 is a playback amplifier for car radio/cassette players.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_P	supply voltage (pin 7)		7.5	–	12	V
I_P	supply current (pin 7)		–	5	–	mA
T_{amb}	operating ambient temperature		–30	–	+85	°C
THD	total harmonic distortion		–	0.05	–	%
α_{cs}	channel separation	R_S = 10 kΩ; L_S = 0	45	–	–	dB

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TDA1523	DIP14	plastic dual in-line package; 14 leads (300 mil)	SOT27-1

BLOCK DIAGRAM

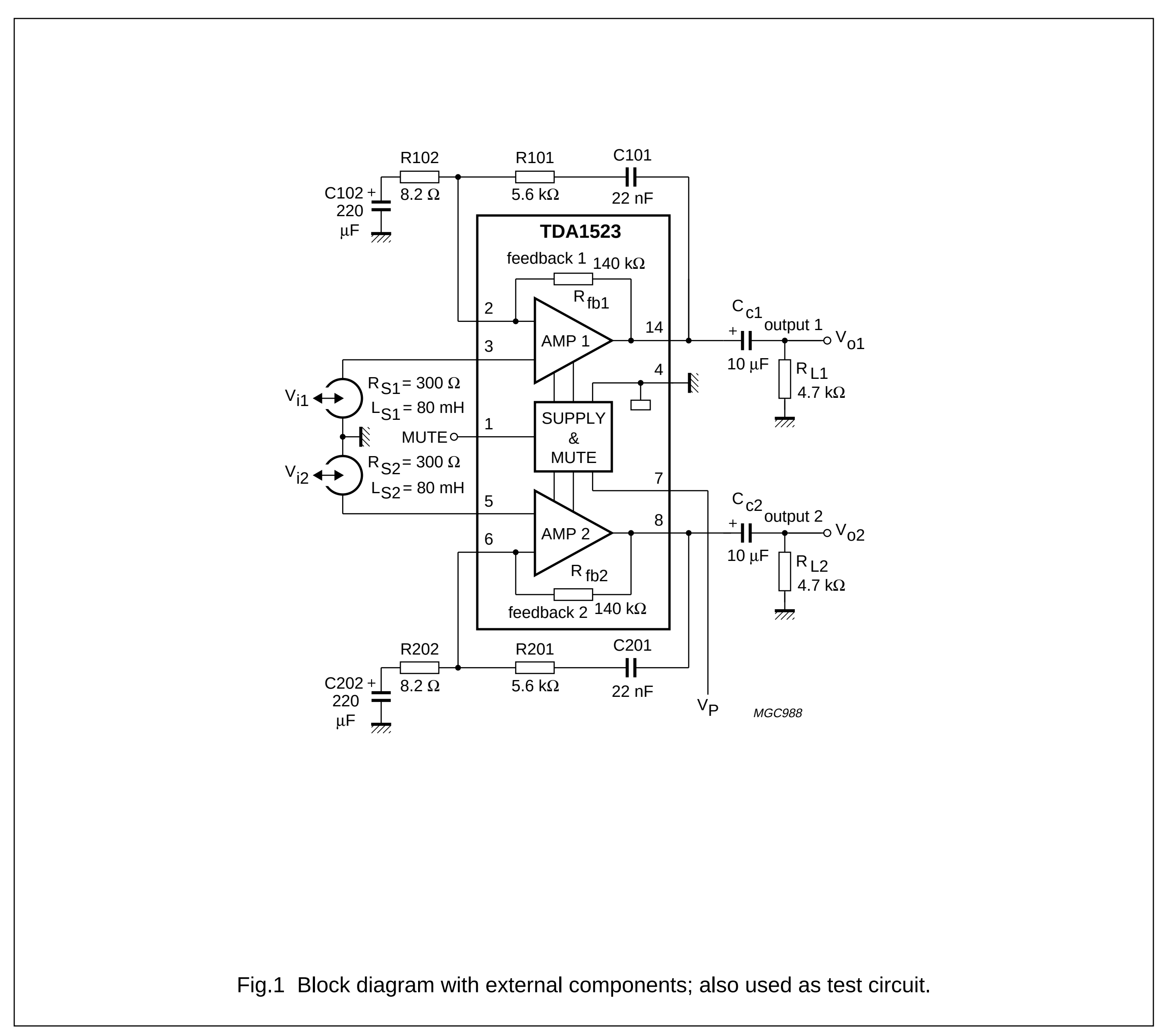


Fig.1 Block diagram with external components; also used as test circuit.

PINNING

SYMBOL	PIN	DESCRIPTION
MUTE	1	mute input
FB1	2	feedback 1
V_{i1}	3	input voltage 1
GND	4	ground
V_{i2}	5	input voltage 2
FB2	6	feedback 2
V_P	7	power supply
V_{o2}	8	output voltage 2
n.c.	9	not connected
n.c.	10	not connected
n.c.	11	not connected
n.c.	12	not connected
n.c.	13	not connected
V_{o1}	14	output voltage 1

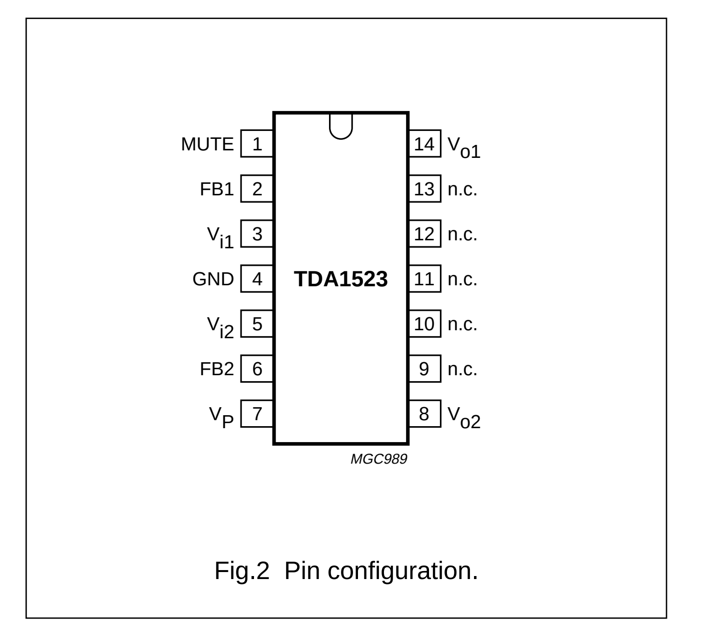


Fig.2 Pin configuration.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134); note 1.

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_P	supply voltage (pin 7)	7.5	12	V
I_{fb}	feedback current (pins 2 and 6)	–	10	mA
P_{tot}	total power dissipation	–	300	mW
T_{amb}	operating ambient temperature	–30	+85	°C
T_{stg}	storage temperature	–55	+150	°C

Note

1. All pins except 2 and 6 (feedback) can be connected to V_P (pin 7) or ground (pin 4).

CHARACTERISTICS

V_P = 8.5 V; T_{amb} = 25 °C; see test circuit Fig.1; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply (pin 7)						
V_P	supply voltage		7.5	–	12	V
I_P	supply current		–	5	–	mA
Inputs (pins 3 or 5)						
$V_{ni(rms)}$	unweighted noise input voltage (RMS value)	f = 20 Hz to 20 kHz; measured in Fig.3	–	1.6	–	μV
V_{ni}	noise input voltage	R_S = 0; f = 1 kHz; measured in Fig.3; see also Fig.5	–	5	–	$\frac{nV}{\sqrt{Hz}}$
I_{ni}	noise input current	f = 1 kHz; measured in Fig.3; see also Fig.6	–	1.2	–	$\frac{pA}{\sqrt{Hz}}$
I_3, I_5	DC input current at pins 3 and 5		–	–	–2	μA
$\lvert Z_i \rvert$	input impedance	f = 1 kHz; note 1	200	–	–	kΩ
Outputs (pins 14 or 8); see Fig.7						
V_o	output voltage	V_i = 0.3 mV; f = 315 Hz	–	0.72	–	V
		THD = 1%; f = 1 kHz	1.0	–	–	V
I_O	output source current	V_{1-4} ≥ 7.5 V; mute off	–5	–10	–	mA
V_O	DC output voltage		–	3.7	–	V
$V_{no(rms)}$	weighted noise output voltage; DIN A (RMS value)	R_S = 300 Ω; L_S = 80 mH	–	700	–	μV
V_{no}	weighted noise output voltage					
	CCITT (peak value)	R_S = 300 Ω; L_S = 80 mH	–	1200	–	μV
	CCIR (peak value)	R_S = 300 Ω; L_S = 80 mH	–	1600	–	μV
V_{no}	unweighted noise output voltage; DIN 45405 (peak value)	R_S = 300 Ω; L_S = 80 mH	–	1800	–	μV
$\lvert Z_o \rvert$	output impedance	f = 1 kHz; note 1	–	–	1	kΩ

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Mute on/off (pin 1); see Fig.4						
$V_{mute(on)}$	mute on voltage	mute switch closed	0	–	1	V
$I_{mute(on)}$	mute on current	mute switch closed or V_{1-4} = 0 V	–	2.7	–	μA
$V_{mute(off)}$	mute off voltage	mute switch open	7.5	–	V_P	V
General						
R_{fb}	internal feedback resistor	note 1	100	140	180	kΩ
G_v	open-loop voltage gain	f = 315 Hz; note 1	–	90	–	dB
α_{cs}	channel separation	R_S = 10 kΩ; L_S = 0; note 2	45	–	–	dB
PSRR	power supply ripple rejection	$V_{P(rms)}$ = 0.1 V; f = 100 Hz; note 3	90	95	–	dB
THD	total harmonic distortion	f = 1 kHz; V_o = 0.3 V; note 4	–	0.05	–	%

Notes

1. Applies to each amplifier.
2. Frequency range 300 Hz to 20 kHz.
3. Referred to the input.
4. Measured selective.

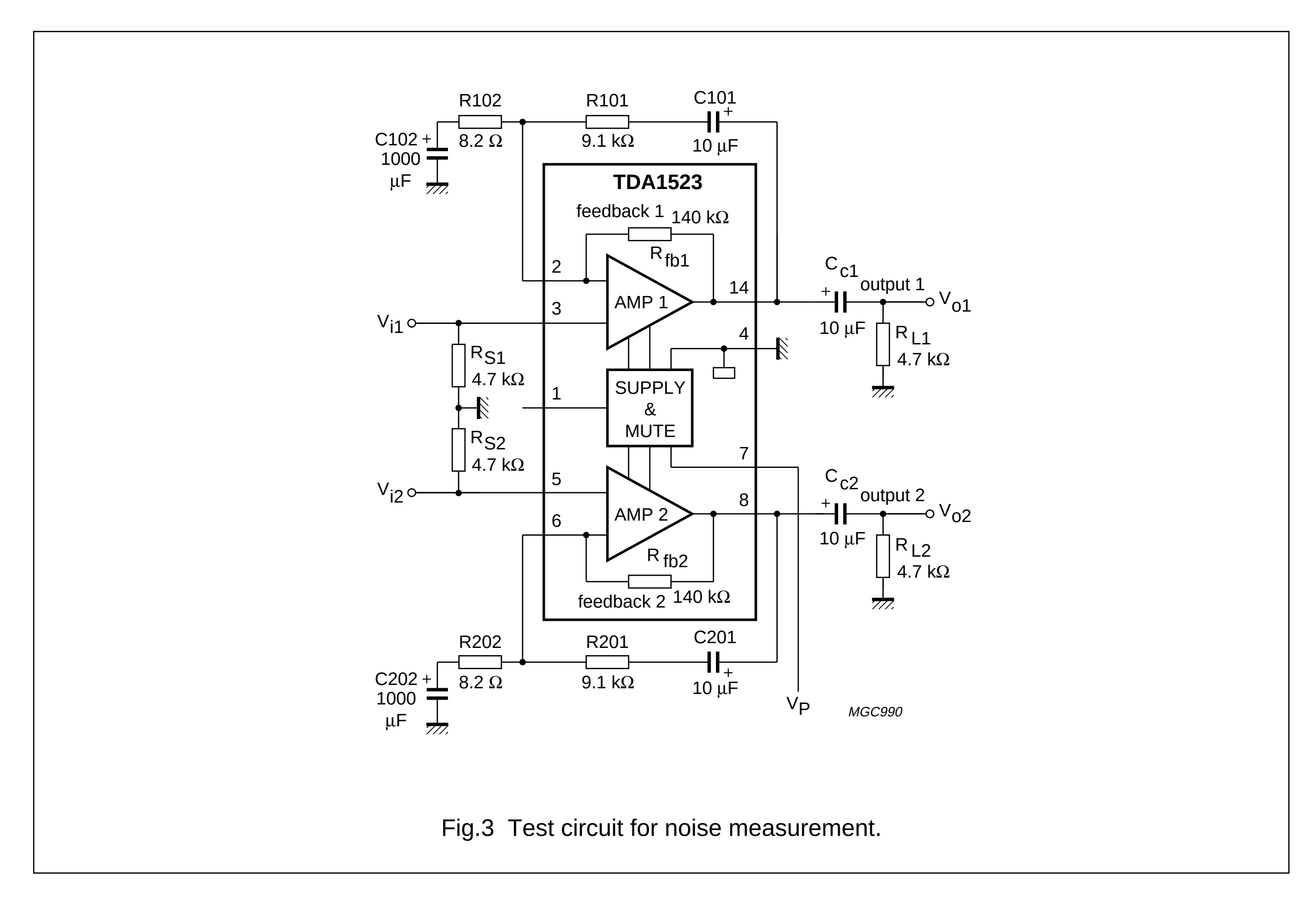


Fig.3 Test circuit for noise measurement.

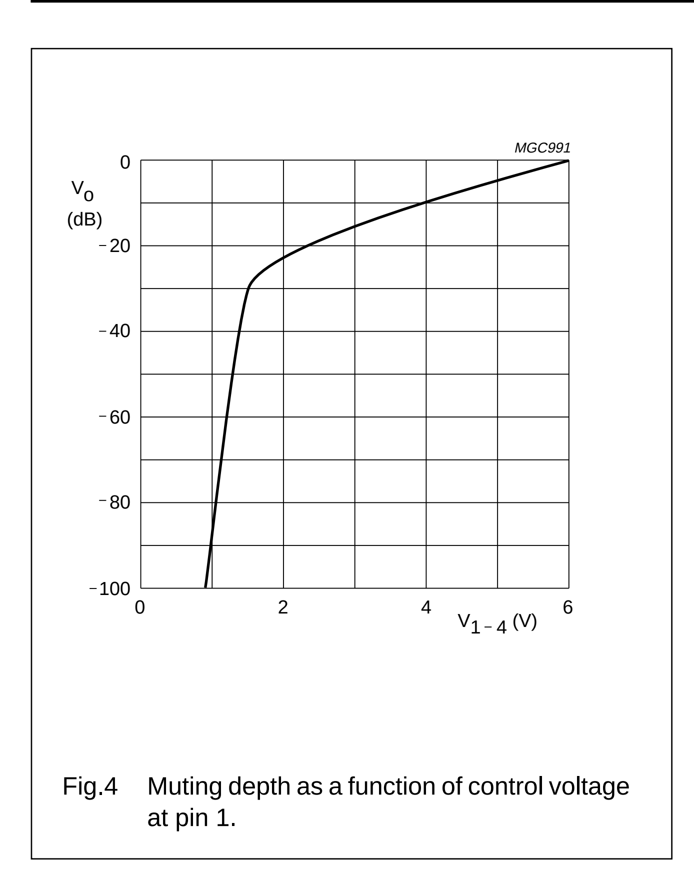
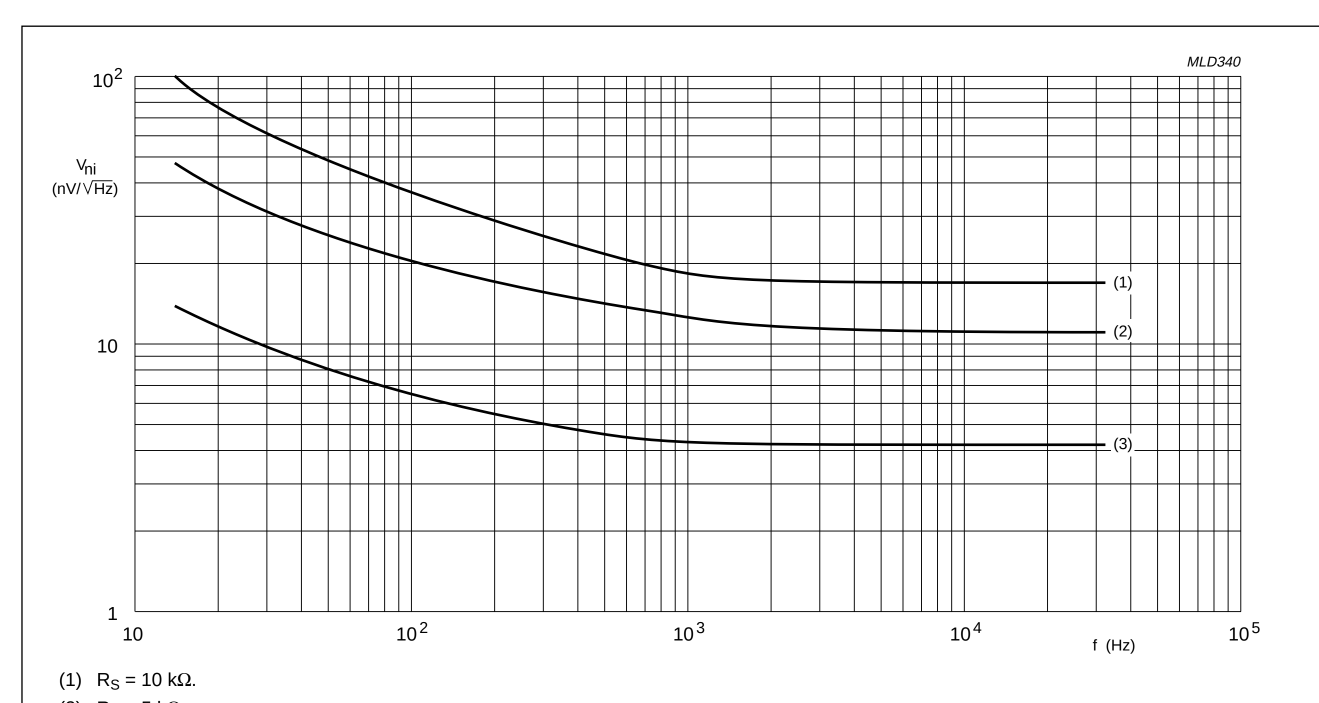


Fig.4 Muting depth as a function of control voltage at pin 1.



(1) R_S = 10 kΩ.
(2) R_S = 5 kΩ.
(3) R_S = 0.

Fig.5 Noise input voltage as a function of frequency.

Fig.6 Noise input current as a function of frequency.

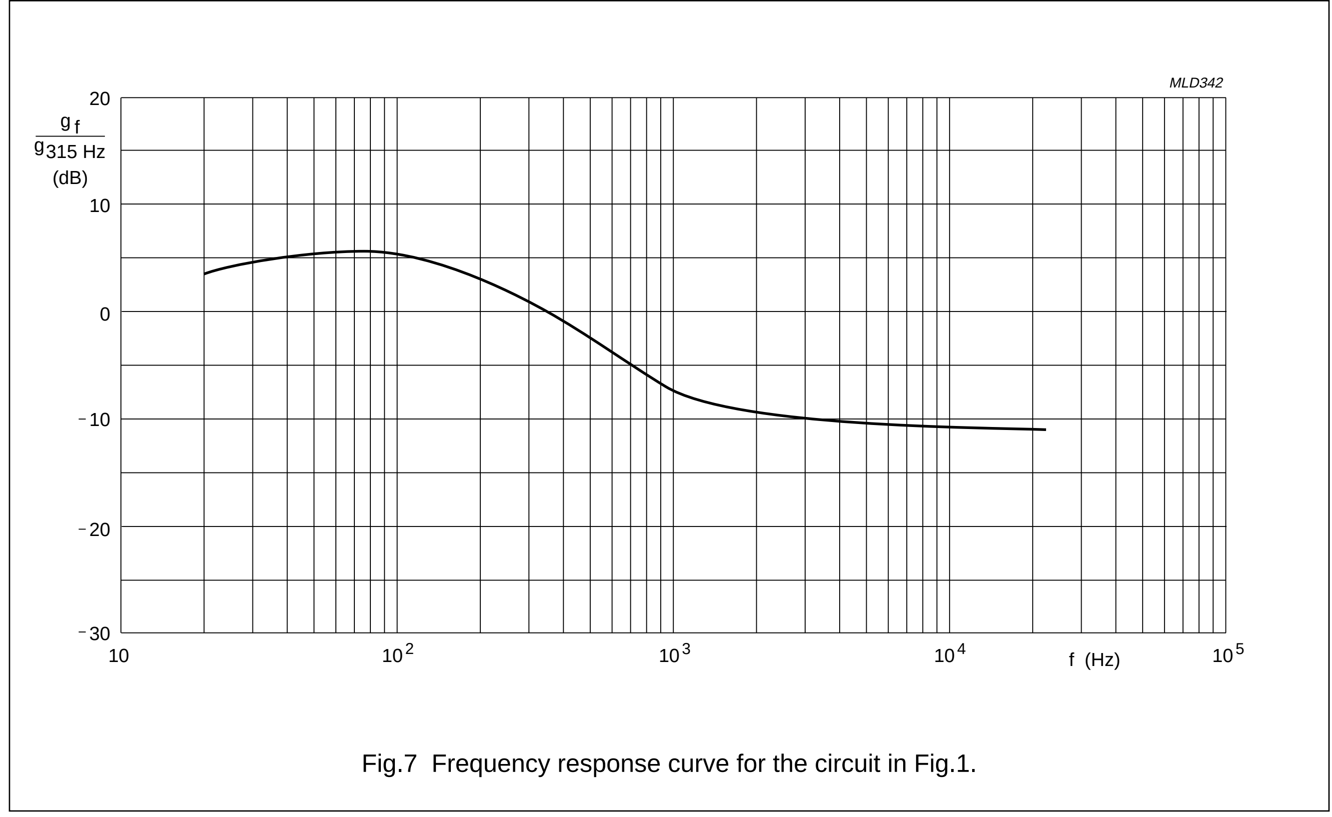


Fig.7 Frequency response curve for the circuit in Fig.1.

PRINTED-CIRCUIT BOARD

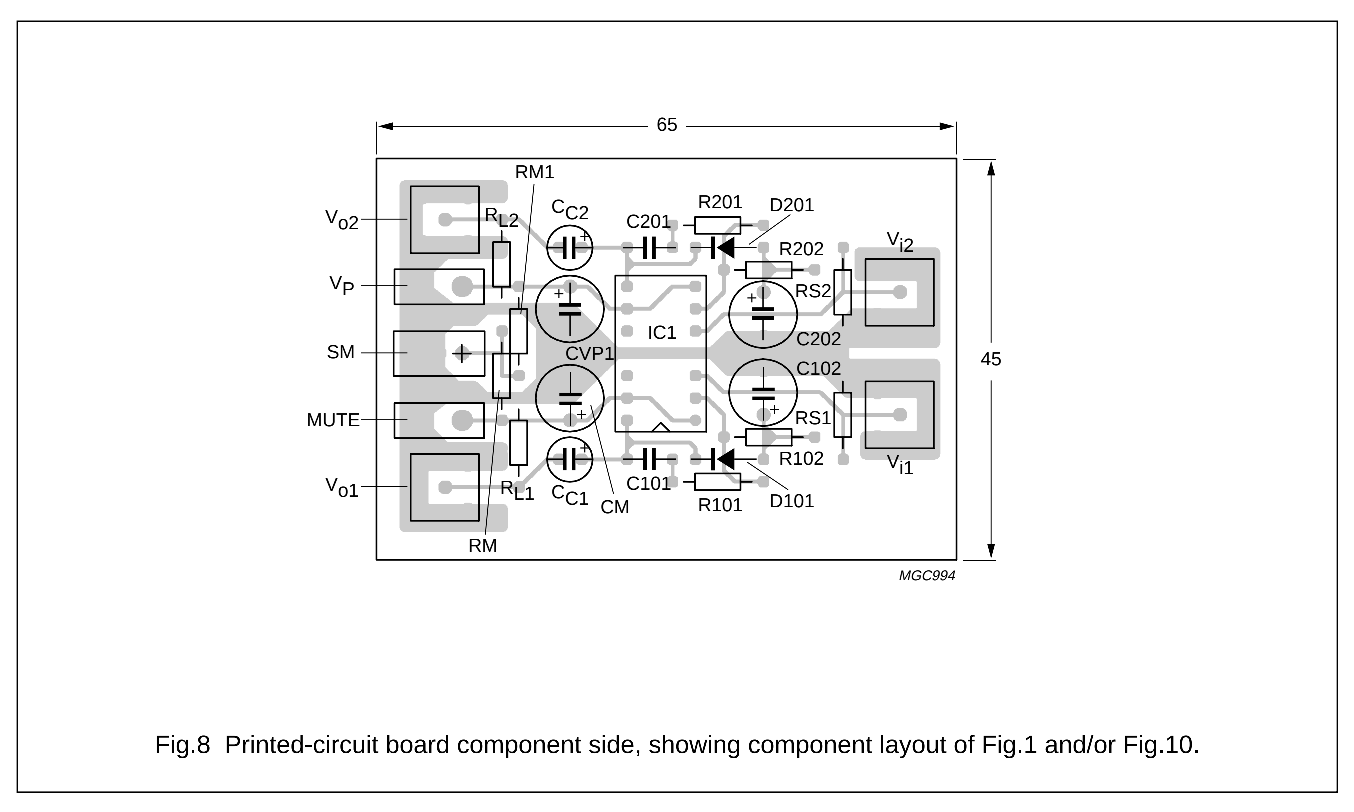


Fig.8 Printed-circuit board component side, showing component layout of Fig.1 and/or Fig.10.

APPLICATION INFORMATION

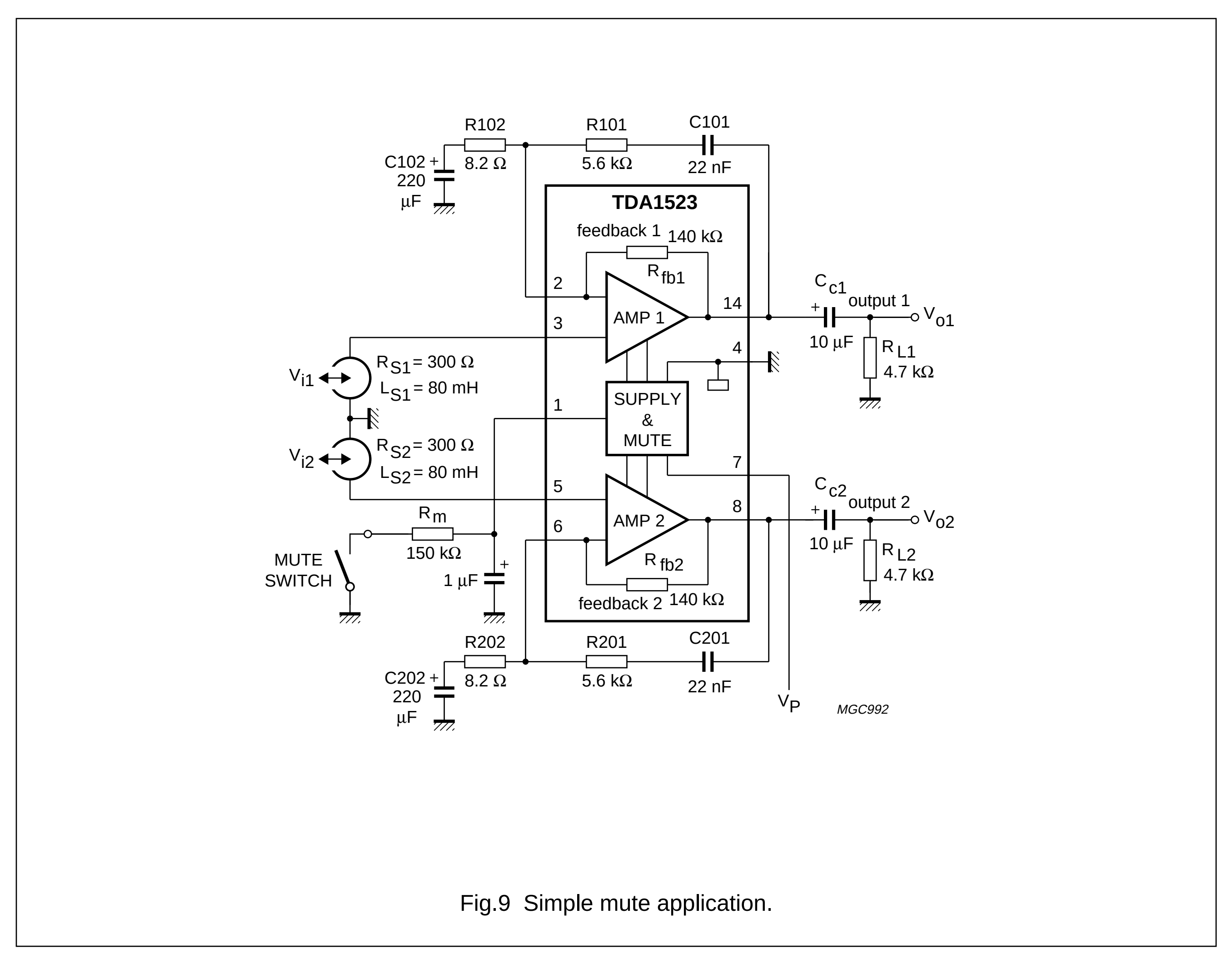


Fig.9 Simple mute application.

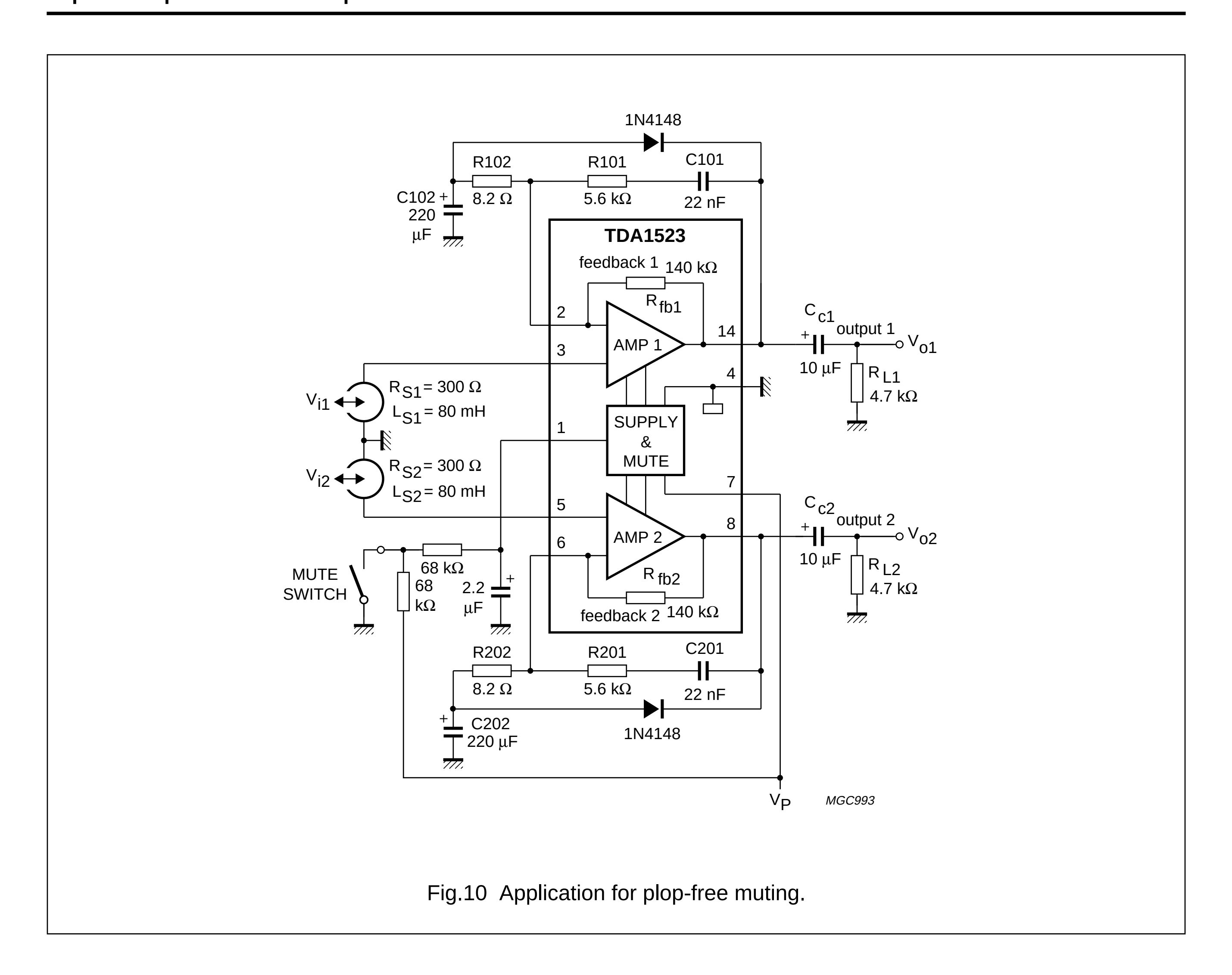
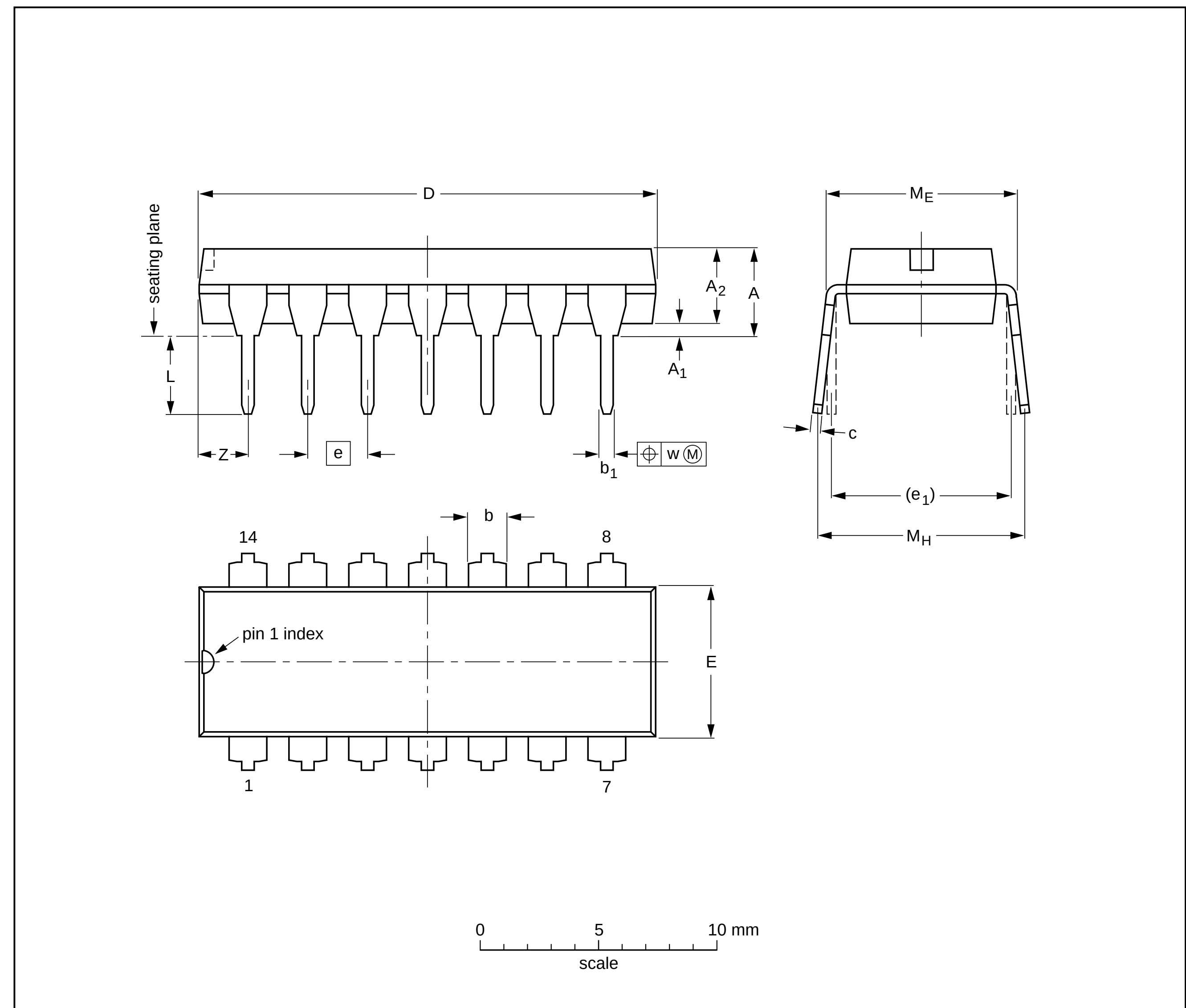


Fig.10 Application for plop-free muting.

PACKAGE OUTLINE

DIP14: plastic dual in-line package; 14 leads (300 mil) **SOT27-1**



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A_1 min.	A_2 max.	b	b_1	c	D (1)	E (1)	e	e_1	L	M_E	M_H	w	Z (1) max.
mm	4.2	0.51	3.2	1.73 1.13	0.53 0.38	0.36 0.23	19.50 18.55	6.48 6.20	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	2.2
inches	0.17	0.020	0.13	0.068 0.044	0.021 0.015	0.014 0.009	0.77 0.73	0.26 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.087

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT27-1	050G04	MO-001AA				~~92-11-17~~ 95-03-11

SOLDERING

Introduction

There is no soldering method that is ideal for all IC packages. Wave soldering is often preferred when through-hole and surface mounted components are mixed on one printed-circuit board. However, wave soldering is not always suitable for surface mounted ICs, or for printed-circuits with high population densities. In these situations reflow soldering is often used.

This text gives a very brief insight to a complex technology. A more in-depth account of soldering ICs can be found in our *"IC Package Databook"* (order code 9398 652 90011).

Soldering by dipping or by wave

The maximum permissible temperature of the solder is 260 °C; solder at this temperature must not be in contact with the joint for more than 5 seconds. The total contact time of successive solder waves must not exceed 5 seconds.

The device may be mounted up to the seating plane, but the temperature of the plastic body must not exceed the specified maximum storage temperature ($T_{stg\ max}$). If the printed-circuit board has been pre-heated, forced cooling may be necessary immediately after soldering to keep the temperature within the permissible limit.

Repairing soldered joints

Apply a low voltage soldering iron (less than 24 V) to the lead(s) of the package, below the seating plane or not more than 2 mm above it. If the temperature of the soldering iron bit is less than 300 °C it may remain in contact for up to 10 seconds. If the bit temperature is between 300 and 400 °C, contact may be up to 5 seconds.

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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NOTES

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